



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,071	04/15/2004	Yoshikazu Miyajima	1232-5381	9987
27123	7590	09/13/2005	EXAMINER	
MORGAN & FINNEGAN, L.L.P. 3 WORLD FINANCIAL CENTER NEW YORK, NY 10281-2101			MATHEWS, ALAN A	
			ART UNIT	PAPER NUMBER
			2851	

DATE MAILED: 09/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/826,071	Applicant(s) MIYAJIMA, YOSHIKAZU	
	Examiner Alan A. Mathews	Art Unit 2851	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 8 and 12-16 is/are rejected.
- 7) ☒ Claim(s) 4-6 and 9-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Numeral “107F” on page 5 of the specification is not in the drawings. In addition, numeral “7F” recited on page 9, line 15, is not in the drawing. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

2. Claim 15 is objected to because of the following informalities: Claim 15 depends from claim 15 (i.e., itself). In addition there is no proper antecedent basis for “said forcing unit”, since all previous claims only recites a “forcing member”.

Appropriate correction is required.

*Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 7, 8, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Petasch et al. (U. S. Patent Application Publication No. 2004/02576683). Petasch et al. discloses in paragraphs # 2, # 77, and # 80 that the system can be used as an optical element in an imaging system in a semiconductor lithography apparatus. Figures 8-10 and paragraphs # 60 - # 70, disclose the embodiment where the optical element is a mirror 9 (see figure 1). The optical element could also be a lens (see paragraph # 77). The optical element 9 has a magnetic element 19 (see paragraph # 60). Electromagnetic drive 20 is a forcing member that applies a force in a non-contact manner to element 19 and thus to optical element 9 (see paragraph # 62, which uses the expression “**contactless fashion**”, and see paragraph # 67). With respect to claim 3, element 20 is a permanent magnet or an electromagnet. With respect to claim 7, paragraph # 56 discloses “any desired angular position”. The preamble to claim 1 has not been given any patentable weight, since the body of claim 1 after “comprising” has not referred back to the preamble.

5. Claims 1, 2 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Yasuda et al. (U. S. Patent No. 6,549,271). Yusuda et al. discloses in figure 1 an exposure apparatus that illuminates a pattern on an original form and exposes a plate 20. Mask 10 is considered to be an optical member. Column 2, lines 52-54, column 3, lines 32-34, and column 10, lines 26-28, disclose deformation of the mask 10 due to gravity. Column 14, lines 42-50, disclose a forcing member 34 that correct the deformation of mask 10. The forcing member 34 does not, itself, contact optical element 10. Claim 15 is objected to above as depending from itself. Assuming claim 15 depends from claim 1, sensors 22 measure the deformation of optical element 10, which could be caused by an increased temperature of the mask (see column 1, lines 32-34, column 3, lines 18-30).

6. Claims 1, 3, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Sandstrom (U. S. Patent No. 6,747,783). Sandstrom discloses figure 6 an exposure apparatus that illuminates a pattern on element 611. Figures 1 and 4b disclose micromirrors, which are optical elements. The micromirrors can be moved electrostatically (see column 3, line 28), which would be moving the micromirrors in a non-contact manner.

*Claim Rejections - 35 USC § 103*

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 12, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petasch et al. (U. S. Patent Application Publication No. 2004/02576683) in view of either Komatsuda et al. (U. S. Patent No. 6,526,118) or Komatsuda (U. S. Patent No. 6,781,671). Petasch et al. discloses in paragraphs # 2, # 77, and # 80 that the system can be used as an optical element in an imaging system in a semiconductor lithography apparatus. Figures 8-10 and paragraphs # 60 - # 70, disclose the embodiment where the optical element is a mirror 9 (see figure 8). The optical element 9 has a magnetic element 19 (see paragraph # 60). Electromagnetic drive 20 is a forcing member that applies a force in a non-contact manner to element 19 and thus to optical element 9 (see paragraph # 62, which uses the expression “**contactless fashion**”, and see paragraph # 67). With respect to claim 3, element 20 is a permanent magnet or an electromagnet. With respect to claim 7, paragraph # 56 discloses “any desired angular position”. Thus, Petasch et al. discloses the invention except for specifically disclosing that the lithography device has an illumination optical system for illuminating the pattern on an original form and a projection optical system for introducing the light from the pattern to the plate. Komatsuda et al. ' 683 discloses an illumination optical system and a

Art Unit: 2851

projection optical system for exposing a plate and reflectors. Komatsuda et al.'671 discloses an illumination optical system and a projection optical system for exposing a plate and reflectors. Komatsuda et al.'671 further discloses wavelengths on the order of 5nm to 20 nm. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Petasch with an illumination optical system for illuminating a pattern on an original form and a projection optical system for introducing the light from the pattern to the plane in view of either Komatsuda et al. '118 or Komatsuda '671 for the purpose of having a complete exposure device.

9. Claims 1, 2, 7, 8, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (U. S. Patent No. 6,295,118) in view of Petasch et al. (U. S. Patent Application Publication No. 2004/0257683). Takeuchi discloses in figure 9 an exposure apparatus that illuminates a pattern on an original form 2 and exposes a plate 6. Column 3, lines 25-26, and figure 2A discloses correcting optical element 91 for gravity deformation. Optical element 91 is corrected using piezoelectric devices 93 (which are forcing members which apply a force to the optical member 91. Figure 14 in Takeuchi discloses a development step. Thus, Takeuchi discloses the invention except for specifically stating that the forcing member applies a force to the at least one optical element in a non-contact manner. Petasch et al. discloses in paragraph # 62 using magnetic elements 19 and electromagnetic drive 20 to move optical element 9. The optical element 9 could be a lens (see paragraph # 77). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have magnetic means to move the optical element 9 in Takeuchi in a non-contact manner in view of Petasch et al. for the

Art Unit: 2851

purpose of easier control and avoiding frictional contact and thus avoiding the heat generated by friction.

*Allowable Subject Matter*

10. Claims 4-6 and 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The reasons for the indicated allowability of the claims are as follows:

The prior art does not disclose or suggest a wave front aberration measuring unit for measuring wave front aberration of a projection optical system that includes at least one optical element; and a controller for controlling said forcing member based on a measurement result of said wave front aberration measuring unit in combination with all the other elements recited in the parent claim to dependent claim 4.

The prior art does not disclose or suggest a wave front aberration measuring unit for measuring wave front aberration of a projection optical system that includes at least one optical element, and a controller for controlling said position adjusting unit based on a measurement result of said wave front aberration measuring unit in combination with all the other elements recited in the parent claims to dependent claim 9.



Art Unit: 2851

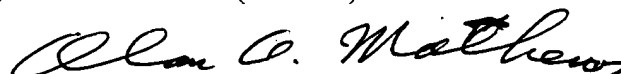
***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patent to Takeuchi is cited to show correcting for gravity deformations in column 3, lines 25 and 26. The patent to Sudoh is cited to show a mechanical device for correcting gravity deformation in a lithographic apparatus (see column 4, line 11). The patent to Nelson is cited to show an electrostatically controlled (non-contacting) beam steering device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alan A. Mathews  
Primary Examiner  
Art Unit 2851

AM